A PUBLICATION OF THE NORTH AMERICAN MYCOLOGICAL ASSOCIATION

The Mycophile Quarterly

OCTOBER NOVEMBER DECEMBER 2023

HOLIDAY GIFT GUIDE

Holiday Delectables

McIlvainea Returns

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Toadstool Picker's Review 4
NAMA President Trent Blizzard

NAMA NEWS 7

A *McIlvainea* Resurgence: Three New Scientific Papers 7
Laura Juszczak, PhD, *McIlvainea* Editor

Instagratitude!.....10
Kathy Yerich, Marketing Committee Chair

Congratulations to NAMA Memorial Fellowship Recipient Syrena Whitner..... 11
Syrena Whitner, University of Hawai'i at Mānoa

Announcing the 2024 NAMA Annual Foray Logo Contest 13
Rose Tursi, Visual Arts Committee Chair

2024 NAMA Holiday Gift Guide 16

NAMA Eats 24

Holiday Delectables from NAMA Culinary Artists 24
Eugenia Bone, Charles Luce, Graham Steinruck

Featured Articles 31

Medicinal Mushrooms in Wound Healing Part II.....31
Hayden Tyler Johnson

AI-generated Mushroom Books: Life and Death..... 39
Elan Trybuch, Secretary of New York Mycological Society

NAMA Reads 42

Wonderland: The Secret World of Mushrooms, author Jan Vermeer 42
Book Review by Liz Weinstein

Mushrooming: An Illustrated Guide to the Fantastic, Delicious, Deadly, and Strange World of Fungi 44
Book Review by Barbara Ching, PhD

MYCO Opportunities 46

Coming in April to Argentina: 11th International Workshop on Edible Mycorrhizal Mushrooms 46
David Pilz

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Visit www.namyco.org or email Luke Smithson
membershipmanager@namyco.org

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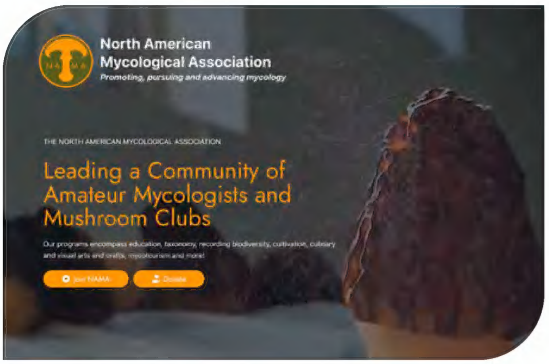
Archive Copies
of the newsletter are available in the Publications section of the NAMA website, www.namyco.org

Content
Please contact Mycophile@namyco.org with your article proposals and ideas. We'll get you published!

Submissions
Submissions must be received in editable-document format (do not send pdfs), with photos attached separately (not embedded) and photo credits provided.

NAMA Toadstool Picker's Review

Technology is Critical to NAMA


North American
Mycological Association
Promoting, pursuing and advancing mycology
THE NORTH AMERICAN MYCOLOGICAL ASSOCIATION
Leading a Community of Amateur Mycologists and Mushroom Clubs

Technology is critical to NAMA: email, Google Drive, membership management software, Zoom, Paypal/ Paygage, Instagram and Facebook are all essential part of our growing organization's functioning. These are the tools we need to use as we deliver upon NAMA's mission.

Technologies need to be refreshed regularly. We did a major upgrade earlier this year when we converted our AMS (Association Management Software) to GlueUp. Our ten-year-old website was the next piece of this puzzle that needed attention because it had issues that could only be resolved with a full reconstruction. I am pleased to announce we have redesigned and built a new website on an upgraded platform. This new public-facing website represents the achievement of a major goal and ushers NAMA into the next 10 years! A big thanks to Kristen Blizzard, Chair of our Website Committee and Website Administrator, for overseeing this accomplishment.

Beyond just looking great and being easy to use, the new NAMA website provides some major advantages:

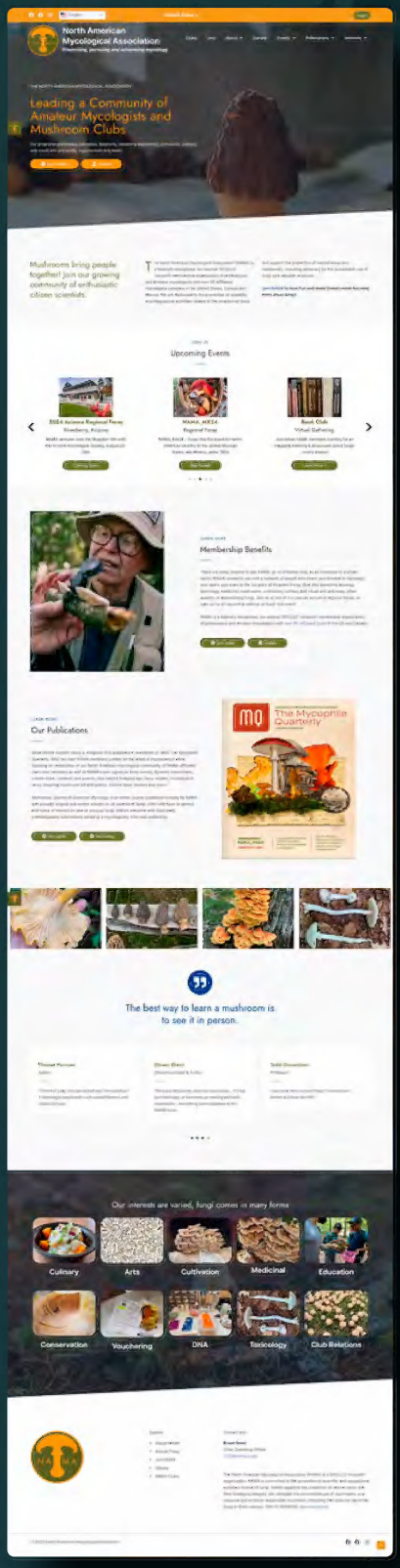
Independence and Ownership—The previous incarnation of our website was built on a proprietary platform that locked NAMA into a fee-based relationship to maintain. One of our goals was to create a website that we own and can manage independently into the future. The new WordPress platform offers us this independence.

Mobile Friendly—Websites in 2023 need to work great on mobile phones. In fact, more than 50% of our website visitors are using a mobile device. Our new platform is mobile responsive, giving our website editors extra controls to manipulate and enhance the mobile experience.

Up-to-Date Compliance—Increasingly, the world is asking websites to be accessible and respect privacy. Our new website is ADA compliant, which means it is more accessible, especially to people with a visual impairment. We have privacy and cookie policies too!

Further improvements we can tout:

- **Collaboration** - WordPress makes it easier to provide logins to a whole



team of people to manage the content relating to them or their committee

- **Recipes** - we added a nice recipe format for all the recipes that were on the old website
- **Book Reviews** - we consolidated all of our book reviews from old Mycophiles into one place on the website were users can easily browse the reviews.
- ***Mycophile* Reader** - we added a nice visual on-page reader for our Mycophile so that users can read it more like an online book
- **Member Club Map** - we added a map and a list of all our clubs to help users find their local club more easily
- **Event Calendar** - our new events calendar should make it easier for people to see upcoming forays, webinars, book clubs, etc.
- **Donations** - The website features a donation area that allows people to support NAMA beyond just their membership. These tax-deductible donations fund our Scholarship Program, which we seek to expand even further.

The new website's launch is just the beginning as we continue to add content and features that make it more useful and valuable to NAMA members, affiliated clubs and everyone in the North American mycology community.

Trent Blizzard

Trent Blizzard
President

NAMA

News

Learn about the Different Things Happening in and Around NAMA.

A *McIlvainea* Resurgence: Three New Scientific Papers

LAURA JUSZCZAK, PHD, *MCILVAINEA* EDITOR

Cover illustration for volume 32 showing 'sporecicles' on *Pleurotus ostreatus* (NC23-7462) collected at Appalachia NAMA 2023 Annual Foray on 8/26/23 by J.Maden at Pink Beds, Transylvania County, NC. Photo by L. Juszczak

I am happy to announce that three superb papers have been posted in time for the closeout of the 2023 volume of the NAMA journal, *McIlvainea*, whose cover illustration is reproduced at right. The subtitle for this volume might be "strange but true." At the Appalachia NAMA 2023 Annual Foray in August, a specimen of *Pleurotus ostreatus*—a fairly common find—developed these strange hanging strands as the specimen sat in the open on a table in the collection area. After photographing, I collected a few strands and later confirmed that the strands were composed of accumulated spores.

The theme of "strange but true" is carried further by the lead-off paper, "*Mycena jingyinga*: a bioluminescent species recently described from Taiwan is reported in North America" by Kyle Canan, Scott Ostuni, Mandie Quark and Joshua Birkebak. The North American *M. jingyinga* specimen, commonly known as

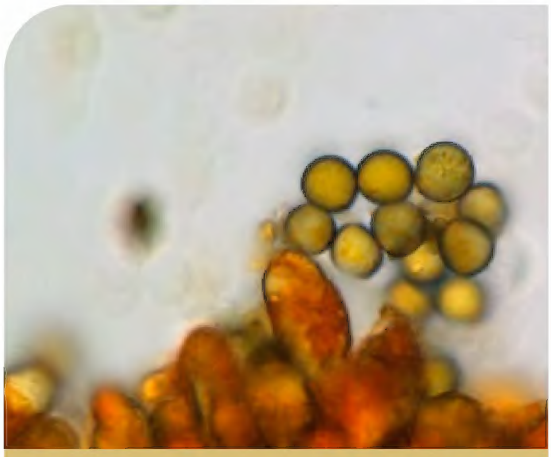
'crystalline mycena' in China, was collected by Crystal Davidson in May 2023 in Clermont County, Ohio. A photo of the specimen *in situ* is shown at the right. This is the first report of this species in North America. The authors' scientific analysis included DNA sequencing and both micro- and macromorphological analysis. The dataset and sequence alignment are available as supplemental files; a figure showing the phylogeny tree is included. The question that remains unanswered is, of course, how did *M. jingyinga* arrive in North America or is it possible that it has just been overlooked until now?

Fruiting bodies of the *M. jingyinga, in situ,* collected in Ohio in May 2023 by Crystal Davidson.

The next paper to appear in volume 32 is "*Cortinarius saniosus* reported from tropical and subtropical Florida with unique genotype shared among midwestern and southeastern, but not boreal/montane, North America collections" also authored by Kyle Canan, Scott Ostuni and Joshua Birkebak. Here, the geographic range of a wide-ranging nontropical species, *C. saniosus*, has been extended to the only tropical and subtropical region on the North American continent through the careful collecting of amateur mycologists and their subsequent DNA analysis. Subtle genetic differences and similarities are discussed and phylogenic reconstructions based on the ITS primer sequence are given. As stated by the authors, "This discovery was a result of the dedicated efforts of non-academic, community mycologists and can hopefully serve as inspiration for others in the community to explore and publish discoveries of their own."

The final crescendo in *McIlvainea*, volume 32 belongs to "Comparative Color Reaction of *Amanita* Spores with Lugol's and Melzer's Iodine," by Patrick Verdier. This is a comprehensive scientific and historical study of the various iodine-containing reagents used to differentiate amyloid and inamyloid spores. Like the little red hen who was solely responsible for the harvesting and preparing grain for the bread she ultimately baked, Mr. Verdier was solely responsible for collecting the spores from 13 species of *Amanita* in four different states, as well as spores of the genus *Russula*, in preparation for his subsequent microscopical

work. Given his professional background in microscopy, the accompanying photomicrographs are stunningly beautiful. The complexity of the interactions with the several iodine-containing staining reagents does not lend itself to a summary here. Readers must encounter the work itself; they will not be disappointed. In short, this paper is a *tour-de-force*.



Basidia and spores of *Amanita lavendula*. Basidia and spores treated with 0.5% Lugol's iodine solution. Photo by Patrick Verdier.

MCILVAINEA ONLINE

All three papers can be found by clicking here.

McIlvainea, the Journal of American Mycology, is published by NAMA as an online journal under Editor Laura Juszczak, PhD. *McIlvainea* accepts original and review articles on all aspects of fungi. Articles with color photographs, illustrations, keys to genera and notes of interest on rare and unusual fungi are especially welcome. For more information on submitting to *McIlvainea*, please click the link below.

SUBMISSIONS

McIlvainea
JOURNAL OF AMERICAN AMATEUR MYCOLOGY
Spore 'stalactites' on Pleurotus ostreatus collected 8/26/23 at the Appalachia NAMA foray (NC23-7462), Pink Beds, Transylvania county, NC, by J. Maden. Photo: L. Juszczak
Volume 32 – 2023
A Publication of the North American Mycological Association

Instagratitude!

KATHY YERICH, MARKETING COMMITTEE CHAIR

Huge thanks to the Instagram Takeover Artists who provided a veritable feast of mushroom content on NAMA's Instagram pages. From 10/2/23 to 11/18/23 the artists, listed below by name and Instagram handle, served up colorful, thoughtful, tasteful and educational images and stories to our now almost 24,000 followers. Make sure to check out NAMA-affiliated South Sound Mushroom Club @southsoundmushrooms teaser for Pacific Northwest NAMA Camp, our 2024 Annual Foray. More to come about that in the next MQ.

Follow @northamericanmyco to devour this yourself!

INSTAGRAM TAKEOVER ARTISTS

Joseph Pallante	**@myconeer**
Kim Hunter	**@travelingtradersbazaar**
Veronica	**@verpa.conica**
Keara Giannotti	**@keara.giannotti**
Irene Antonez	**@irene_antonez_art**
Rose Tursi	**@southsoundmushrooms**
Garrett Crosby	**@cakewalkcakewalk**

Congratulations to NAMA Memorial Fellowship Recipient Syrena Whitner

SYRENA WHITNER, UNIVERSITY OF HAWAII AT MNOA

Growing up in Michigan, a place with very rich foraging and mycological history, I have very fond memories of hunting for mushrooms in my grandparents' woodlot and the always-building anticipation for annual morel season. I attended Michigan State University, where I fell in love with ecology and took an undergraduate research position in a lichen lab. I worked for graduate student Klara Scharnagl, who was a huge inspiration on my path to pursue mycology, nurturing a love of and curiosity about fungi that has extended into my graduate studies.

I think it goes without saying that fungi are extremely mysterious entities and the thought of journeying into the unknown through research has always captivated me. Within mycology, I study marine fungi. Every day, I have the ability to learn something new as marine fungi are extremely understudied. To me, the most fascinating element of mycology is the diversity of fungal lifestyles, habitats in which they thrive and interactions they have with other organisms (marine microbes in my case).

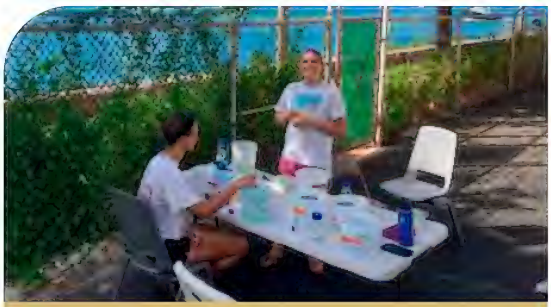
Editor's note: NAMA is delighted to announce that we have been informed by Mycological Society of America (MSA) that Syrena Whitner has been named as recipient of the 2023 NAMA Memorial Scholarship, this year awarded in honor of the much-missed Dr. Tom Volk. Whitner is a PhD candidate studying Marine Biology at the University of Hawai'i at Mānoa and shares the following information on her mycological inspirations, challenges and goals.

It is both a blessing and a curse but the biggest challenge I have encountered in mycology is the lack of research in my chosen field, as well as the general lack of fungal genetic representation both in databases and among marine ecological models. For the most part, fungi are entirely excluded from marine biogeochemical models and studies, making fungi in the world's oceans so far largely unknown.

Skeleton covered with various sponges, used for marine fungal isolation.

Aboard Hawai'i Ocean Time-series Cruise 338; example of pelagic particle trap retrieval, used to study particle-associated fungal communities near Station ALOHA.

My biggest goal is to help increase the inclusion of fungi in marine biogeochemical models within community analyses and just generally to get the word out that marine fungi exist! Fungi are present in every marine ecosystem surveyed thus far; they are known to interact with a breadth of organisms within these environments, yet are always seemingly left out of biodiversity surveys and publications. Recognition of marine fungi's ecological significance is something I think is incredibly important. To make this dream a reality, I am a fervent advocate of scientific communication (both in academic and casual settings), asking ecologically driven questions (and testing for their answers!), as well as forming interdisciplinary collaborations. Ultimately, I hope to pursue a career as a research oceanographer for USFW or NOAA in order to incorporate research on marine fungi into tangible and applicable policy.



Inoculating microcosm tubes with phytoplankton outside at Kewalo Marine Laboratory in Honolulu; (pictured: Syrena Whitner standing; undergrad asst. Giulia Marenco Di Moriondo, seated).

Announcing the 2024 NAMA Annual Foray Logo Contest

ROSE TURSI, VISUAL ARTS COMMITTEE CHAIR

Announcing the the 2024 NAMA Continental Foray LOGO Contest

Hope your calendars are already marked for Annual Foray 2024, officially named **"Pacific Northwest NAMA Camp"** and set for October 31 to November 3, 2024 at Cispus Learning Center just outside of Randle, Washington. This is a call to artists everywhere for your help in creating a beautiful event logo!

Rules:

1. This contest is open to anyone in the world! You do not have to be a NAMA member, though special consideration may be given to NAMA members in the Pacific Northwest region.
2. Entries should contain the official name of the event: **Pacific Northwest NAMA Camp**
3. Entries may contain the regular NAMA organization logo but this is not required. If you would like a vector art file of the NAMA logo, please request via email to visualarts@namyco.org.
4. Each contestant may submit up to 5 entries.
5. Artwork must meet certain requirements for printing; *please see guidelines below.*
6. If you choose to represent a mushroom, we prefer distinctly recognizable, real mushroom species known to occur in the area of the event; fortunately, the Evergreen State of Washington abounds in charismatic fungi! We have listed a few species below.

Submission and Announcement Dates:

1. Contest entries must be received no later than January 31, 2024. Winner will be announced no later than April 1, 2024.
2. Please email all entries to visualarts@namyco.org, with the subject line "2024 Annual Foray Logo Contest Entry."

Requirements for Graphic Artwork:

1. Designs must be vector art that has been optimized for screen printing. This means the design cannot contain any gradient colors or gradient translucency: solid colors only.
2. To keep within product production budget, the design must be limited to 1 or 2 colors (or 3 colors by incorporating the color of the shirt into the design).
3. Vector files such as AI or EPS are preferred.
4. Any fonts used must be free for commercial use.

Other Important Stuff:

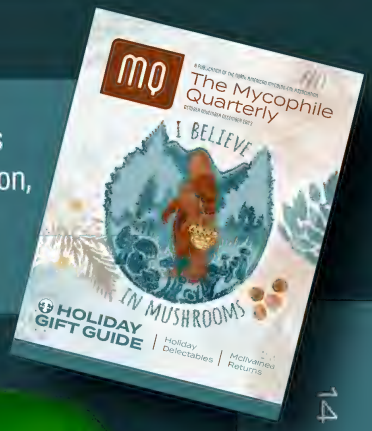
Semifinalists will be selected by representatives from NAMA's Visual Arts, Foray and Marketing Committees, followed by a vote of NAMA's Executive Committee. Please note that NAMA may, at our discretion, alter graphic elements, font or verbiage on the chosen design.

PRIZES:

The artist behind the winning logo design will receive the following:

A one-year membership to NAMA or a one-year extension if they are already a member.

A feature in NAMA's quarterly publication, *The Mycophile Quarterly.*



One example of each item printed with the logo. This will include a t-shirt, sticker, and any other swag that is created for the event.

The winning entry becomes the intellectual property of NAMA for exclusive commercial use in all marketing, merchandising and in any other way the organization sees fit.

Example Species of Washington Mushrooms:

- *Tricholoma murrillianum*, ("Matsutake" or "Pine Mushroom")
- *Boletus edulis* var. *grandedulis*, ("Porcini")
- *Amanita muscaria* var. *flavivolvata*, ("Yellow-skirted Alice-In-Wonderland Mushroom")
- *Xerocomellus zelleri* complex, ("Zeller's Bolete")
- *Stropharia ambigua* ("Questionable *Stropharia*")
- *Agaricus augustus* ("The Prince")
- *Fomitopsis mounceae* (Red-belted Polypore)
- *Phaeolus schweinitzii* ("Dyer's Polypore")
- *Lacrifomes* (*Fomes*) *officinalis* ("Agarikon")
- *Pseudohydnum gelatinosum* ("Cat's-Tongue Jelly")
- *Guepinia helvelloides* ("Red Jelly Tongue")
- *Russula xerampelina* ("Shrimp *Russula*")
- *Ramaria* species
- *Cortinarius violaceus* ("Violet Cort")

Appalachia NAMA 2023 Logo, by Tiffany Theden

2024

Holiday Gift GUIDE

We hope you enjoy this compilation of gift ideas compiled by NAMA members and leadership, including Barbara Ching, Melissa Klotka, Kathy Yerich, Kristen Blizzard, Hunter Le Duc, Spike Mikulski, Darvin DeShazer, Luke Smithson, Trent Blizzard and Bruch Reed. Snag the swag while you can!

NAMA Gift Membership

namyco.org/gift

Spread the mycological joy this holiday season by gifting your loved ones membership in North American Mycological Association! NAMA is a 501(c)(3) nonprofit organization of professional and amateur mycologists with over 90 affiliated mycological societies in the United States, Canada and Mexico. Since 1959, NAMA has been North America's leader in mycological education, research, conservation and advocacy of responsible mushroom use. With a mission dedicated to promoting all things mushroom-related, it's the perfect choice for the mushroom enthusiasts on your gift list.

NAMA Gift Memberships are available at three gifting levels and will be received by the week of December 26. Please click this link and share the passion mycology can inspire! – Luke Smithson

Wilcox All-Pro Foraging Trowel

bit.ly/foragingtrowel

$12-$20 Mushroom lovers covet the second most useful item in my mushroom basket: this tiny trowel. I know because while climbing up the gondola mountain, the first event at our CONAMA 22 Annual Foray, I was stopped by many of the mycophiles who saw me using it to pop mushrooms out of the ground with their volvas intact and wished for one of their very own. Just take a look and imagine all the ways the mycophiles on your list would use it while hunting. It can even replace a knife, generally the most useful basket resident. This shiny red and silver "objet" even has a karmic aura. I found my first one at the first foray at our 2017 Northwoods Annual Foray, a dull glint in a creekbed where I also found a happy supply of watercress. Of course, I have since lost that trowel… but the good news is that it's easily replaced in the giant creekbed of the Internet. Too lazy or clumsy to wrap it? Note the handy leather strap—and hang it on the holiday tree. – Barbara Ching

NAMA Swag!

shop.namyco.org

Snazz up your holidays with NAMAwear! Whether you're a new NAMA member or a seasoned veteran, there is no better way to display your love of mushrooms AND the community that surrounds them than by sporting one of NAMA's new shirts! Are you a classic t-shirt person? Maybe you prefer a soft, thick hoodie? How about a long-sleeved shirt that's versatile enough for all seasons? Whatever the style, size or color you prefer, you can order it from NAMA's new Shopify Store!

Everything is printed on demand, so from purchase to delivery is typically 2 to 3 weeks. So, if the perfect accompaniment to your NAMA Gift Membership is a shirt to claim bragging rights, visit shop.namyco.org – Kathy Yerich

Mushroom Jigsaw Puzzle

bit.ly/mushroompuzzle

$25 Ah, those long winter nights when it's been too chilly too long to forage and there are no mushrooms to clean… perfect for puzzles, though! There are so many fungus-themed choices out there. We like this thousand-piecer from New York Puzzle Company. – Darvin DeShazer

Koji Culinary Enhancers

www.shared-cultures.com/shop

$20 Shared Cultures specializes in developing new, uniquely imaginative applications for koji, a fungal entity with a venerable tradition of use in various Asian cuisines. Farm-to-ferment misos, shoyus and umami seasonings are inspired by traditional

fermentation methods, wild-foraged mushrooms and the bounty of northern California, earning a dedicated following among Michelin-starred chefs and home cooks alike. – Kristen Blizzard

Spicy Mushroom Jerky

bit.ly/smilingearth

$12-$30 This mushroom farm and storefront is owned by longtime New Jersey Mycological Association members Stefanie Bierman and Paul Patterson. Stef has also served as both Secretary and VP for the NJMA. They have a mushroom farm and turn much of their mushrooms into powders, spice mixtures and jerky. My favorite is the Spicy Mushroom Jerky. Sometimes I get them to bring it to forays and we will be off in the corner of the parking lot, making mushroom jerky deals. – Luke Smithson

Mushroom Lover's 3-pack of Moira's Magic Dust

bit.ly/moirasmagic

$40 Maitake Magic powder makes a great addition to omelets, pasta sauces, stir frys, stews and more. The Porcini Rub is made from dried porcini and an inspired herb blend; you will never want steak without it and it's also great on pork and pizza! Puffball Powder adds an indefinable complement to mashed potatoes, soups and egg dishes. – Hunter Le Duc

Shroom Groom Mush Brush

bit.ly/mushbrush

$7 This soft, adorably friendly fella scrubs your forest finds without damaging their delicate skins. – Melissa Klotka

Travelable Light Foray Bag

bit.ly/mushroombags

$35 It's hard to find a sturdy foraging receptacle that's easy to pack. This light mesh bag holds a surprising poundage of your shroomy quarry, niftily combining convenience with durability and ease of cleaning. Made in Ukraine and inspired by rich their cultural mushroom-foraging tradition, its simple, thoughtful design offers an optional belt attachment that's ideal for quick in-and-out park'n'bop forays. – Bruch Reed

Mushroom Tea Towels

bit.ly/karenmilnes

$14 Multifaceted Virginia artist Karen Milnes of Cabin Critter Designs taught our sold-out basketry workshop at Appalachia NAMA 2023. Her online store offers many tempting mushroom-themed gifts. Her handprinted teatowels are classy and classic, thoughtful and affordable. – Bruch Reed

NAMA President Trent Blizzard's Safety-Forward Gift Picks:

Here are some of my favorite items to protect your loved ones in the woods:

NitriShed® 350 Nitrile Bib Overalls

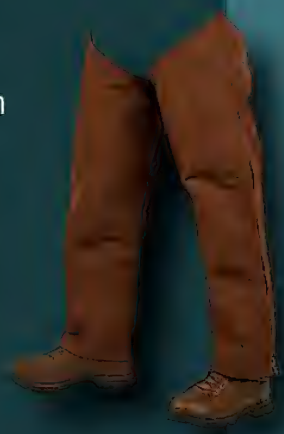
bit.ly/biboveralls

$143 These sturdy rain pants promise protection no matter how difficult the terrain or hard the rain. They should last a lifetime. Thanks to NAMA At-large Trustee Cheshire Mayrsohn for recommending these forester favorites.

Terra Tech Brush Chaps

bit.ly/brushchaps

$37 I spotted these recently on a fellow forager during a coastal Oregon foray. These chaps will protect your favorite mushroom hunter from getting whacked by the bush while they bushwhack.



FUNGI Magazine Subscription

bit.ly/fungimag

$42 Hands down the finest of the fungal publications, with 5 eyepoppingly devourable issues annually, mycophiles of all levels won't be able to put this mag down. Available delivered to your door and/or as a digital subscription, as well as a digital flash drive containing all 15 years of sumptuous back issues! – Bruch Reed

Treestump Red-belted Conk Vessels

TursiArt.etsy.com

$25-$35 Featuring forest fave *Fomitopsis mounceae*, these charming, variously sized individually handsculpted vessels are high fired and hand-painted and can be used as a planter (pair with a fern for an instant forest-floor meditation), vase, pencil-holder or to catch loose change, or decorate a whimsical dinner table (they're food-, dishwasher- and even microwave-safe. – Bruch Reed

Set of 2 Rocky Talkie Mountain Radios

bit.ly/rockytalkie

$220 Walkie-talkies may be the best safety device you carry while foraging! This set is available at a premium price but I can vouch that they work extremely well, have proven durable, easy to use, long range and have a long battery life. We love the built-in carabiner that guarantees they won't be lost!

The Airlift Emergency Dog Rescue Sling

bit.ly/dogairlift

$76 This backpack-friendly rescue sling is designed to carry your dog efficiently and safely if they become injured. As owners of 2 crazy injury-prone dogs, this device is always in our pack and gives us piece of mind.

Mushroom Reagent Chemicals ID Kit

bit.ly/mushroomreagents

$25 Serious mycos find these chemicals indispensable to confirm accurate mushroom identification. This kit features 3 half-ounce durable plastic dropper bottles, one each of potassium hydroxide, iron sulfate and dilute ammonia. Free shipping with code SKIPSHIP. – Chef Spike Mikulski

Annual America the Beautiful Pass

bit.ly/beautifulpass

$80 We use this pass all the time, especially to save on parking passes while foraging across the U.S. It pays for itself and makes a dynamite practical gift for intrepid foragers. We get ours from REI because the price includes shipping to our door. – Kristen Blizzard

The PACT Lite Kit

bit.ly/pactlite

$35 Folks who spend significant time in the woods have probably all been there; it happens! Keep Mother Nature and other hikers—especially innocent curious canines—safe from your regrettable necessity. This all-in-one backcountry bathrooming kit goes beyond just digging a hole: it includes compressed, biodegradable plant-based wipes that unfold into a 9" towel with just a squirt of water. Best of all, it includes myceliated tabs that provide a fungal boost for faster breakdown of your business. Thanks to Hamilton Pevec for this cheeky, ecoconscious suggestion!

Hand-blown Glass Mushroom Sculptures

etsy.me/3uIQ31O

$32 These beautiful homages to our beloved agarics captivate the eye and lend a pleasing whimsy to any decor. Hand blown by glass artist Sarah Schiros of Desert Horse Goods, each is unique and certain to be treasured. – Bruch Reed

Body Blend Balancing Mushroom Powder

bit.ly/hamiltonsmushrooms

$40 This proprietary blend from Hamilton's Mushrooms is balanced to perfection, the all-in-one extract for the self healer who wants to cover all the bases. Use it as a daily tonic, or as a treatment regimen. These four fungi (chaga, *Cordyceps*, reishi and turkey tail) are revered throughout the mycomedicinal community. Why buy four bags when you only need one: Body Blend. – Kristen Blizzard

Masala Chai Tea Blend

bit.ly/elevatedspores

$20-$30 Cozy up, comfort your tum and boost your immune system this winter with a warm cuppa mushroom chai from Elevated Spores. This Masala chai blend contains wild-foraged turkey tail fruiting bodies as well as reishi and chaga from the Northwoods of Wisconsin and Minnesota. – Kristen Blizzard

Cobra Head Foraging Tool

bit.ly/cobraheadweeder

$30 I have depended on this tool since 1997. Technically an ag implement, made and manufactured by a family company in Wisconsin but of course I use mine on mushrooms. Pop out that *Amanita*, bulbous base and all, or excavate ascos from a recalcitrant log; the indomitable curved blade chops chaga like a champ! Comes in regular and mini version. – Bruch Reed

NAMA

Eats

Unlock the Culinary Secrets of Mushrooms and Elevate Your Gastronomic Experience

Holiday Delectables: Recipes from NAMA Culinary Artists

NAMA Culinary Arts Committee Chair **Julie Schreiber** put out a call to committee members to whip up some favorite mushroom-celebrating holiday recipes; as always, our chefs come through with culinary conjurings as adaptable as they are delectable!

Mushroom Sausage Rolls

EUGENIA BONE

Yield: 6 rolls

I saw a version of this recipe in the British newspaper *The Guardian* and knew I had to try it with my own mushroom duxelles. (I make a batch every so often and keep it in the refrigerator.) These rolls are very easy to make and it's very hard to eat just one. They make a great party offering, late-night snack or lunch-while-standing-at-the-counter food. To make life easier, I use pre-made frozen puff pastry. (Pepperidge Farm is fine.) This recipe makes about a half-pint of duxelles. I call for white button mushrooms (*Agaricus bisporus*) here but you can make duxelles out of other species, too, such as hen of the woods (*Grifola frondosa*).

Ingredients

- 1 tablespoon olive oil
- 10 ounces white button mushrooms, minced (about 3 cups)
- ¼ cup minced shallots
- 3 tablespoons white wine, dry marsala or sherry
- Salt and freshly ground black pepper
- One 10-by-10-inch sheet defrosted puff pastry, plus flour for rolling
- 3 tablespoons Dijon mustard
- 12 ounces sausage meat (either loose meat or sausages with casings removed)
- 1 small egg, beaten

To make the duxelles:

Heat the olive oil in a large nonstick skillet over medium heat. If all the mushrooms and shallots can fit in a single layer, then put them all in your pan. Otherwise, prepare the duxelles in batches. If the skillet is crowded, the mushrooms will steam rather than brown, and your end product will be mushy. Sauté the mushrooms and shallots in batches, if necessary, until the mushrooms give up their liquid, and the liquid evaporates, about 10 minutes. Stir frequently. Once all the mushrooms are cooked, return them to the pan (if cooking in batches) and add the wine and salt and pepper to taste. Continue cooking until the duxelles become quite dry and the mushrooms begin to take on a golden color, another 10 minutes (see note).

To make the rolls:

Preheat the oven to 350°F. Lay the sheet of puff pastry on a lightly floured board. Sprinkle some flour over the pastry. With a rolling pin, gently roll out the pastry until it is 1 to 2 inches larger on all sides. Cut the pastry into six pieces, each about the size of a Tarot card (or about 2 x 4 inches). Brush off any extra flour and then brush the mustard on the surface of each piece of pastry.

Season the sausage meat and divide it into six oblong meatballs. Place a sausage ball close to the top of each pastry piece. Spread 1 tablespoon of duxelles along each meatball. Roll the pastry from the top down, encasing the sausage and duxelles. With your brush, add a little beaten egg to the edge of the pastry to seal the dough.

Place the rolls seam down on a baking sheet. (I use a Silpat® on my baking sheet to avoid sticking.) Brush the tops of the rolls with a little more beaten egg. Cut a couple of slits in the rolls so steam can vent during cooking, and pop them in the

oven for about 30 minutes, until they are golden brown. Keep an eye out: They burn easily. These rolls hold great in the refrigerator for a day or so and can be reheated in a low oven.

Note: You can hold duxelles in the refrigerator for a few days if you pack them into a sterilized jar; that is, a jar that has been boiled in water for 10 minutes at sea level, adding 1 minute for every 1,000 feet above sea level.

Turkey Breast Roulade with Sous Vide Porcini

CHARLES LUCE

Yield: 4 servings

During a good porcini year, I dehydrate at least half my hoard. This is a recipe that takes advantage of that stash. Half of this recipe—the turkey roulade—comes from the *New York Times* adaptation of an Ina Garten recipe. The other half—sous vide porcini—is my own invention. Sous vide is an extraordinary method for extracting maximum flavor from mushrooms. A fistful of dried porcini in a pint jar of heavy cream submerged in a sous vide device's water bath, or simply placed in a low-temperature oven, emerges several hours later a brown, fragrant, fatty, umami flavor bomb. You can also make this recipe with two pounded chicken breasts. The recipe calls for some day-ahead preparation. You don't have to have a sous vide water bath or an immersion circulator but do have some kitchen twine on hand and, if you've got one, an instant-read thermometer.

The evening before cooking, place the turkey breast in a large resealable bag and add the buttermilk. Seal the bag, squeezing to eliminate as much air as possible and refrigerate overnight. Remove from refrigeration about 1 hour before preparing the dish.

Several hours before preparing the meal, place the dried porcini slices in a 1-pint glass jar and add the cream. Use a spoon or fork to push the mushrooms under the cream. Seal the jar tightly and submerge in a sous vide bath set to 170°F, or place in a low-temperature oven set to 170°F or as close as you can get to that temperature. Allow the mushrooms to process for 3 to 4 hours, until they are very soft and the cream is a caramel color. Remove them from the heat and allow to cool. Add salt and pepper to taste.

Position a rack in the center of the oven and preheat the oven to 350°F.

Ingredients:

- 2 to 3 pound butterflied, boneless, skin-on turkey breast
- 1 cup buttermilk
- ½ cup (about ½ ounce) dried porcini slices, lightly packed
- ½ cup heavy cream
- Salt and freshly ground black pepper
- 2 tablespoons extra-virgin olive oil, divided
- 1 cup diced yellow onion
- 3 teaspoons minced garlic
- ½ teaspoon nigella seeds
- 1½ teaspoons chopped fresh sage plus several whole sage leaves
- 1 teaspoon minced rosemary leaves
- 1½ teaspoon dried thyme leaves
- ½ cup dry white wine

Heat 1 tablespoon olive oil in a small sauté pan over medium heat. Add the onions and sauté until just beginning to brown, a few minutes. Add the garlic and cook 1 minute to soften. Remove from the heat and add the nigella seeds, sage, rosemary and thyme. Stir and set aside.

Remove the turkey breast from the bag and scrape off as much residual buttermilk as possible. Do not wash. Remove the skin and reserve. If the meat is quite thick, it may be trimmed or pounded to produce an overall thickness of 1 inch or less. Lay the meat out and add salt and pepper to taste, then evenly spread the onion mixture on one side. Spread the porcini and cream mixture evenly over the onion mixture.

Arrange the turkey breast so that the narrow end is next to you, then roll the meat up like a yule log, ending with the seam side up. If the onion and porcini mixtures leak out of the ends, you can either unroll and remove some or reroll the log a little looser. Drape the skin over the seam. If it doesn't cover the entire seam, it's okay. Using clean kitchen twine or string, tie the roulade as you would a roast, at 2-inch or 3-inch intervals (see note). Place the whole sage leaves under the twine.

Place the roulade, skin side up, on a small sheet pan or roasting pan. Drizzle the skin with the remaining 1 tablespoon of olive oil, pour the wine into the pan around the roulade, and roast for 1 to 2 hours, or until an instant-read thermometer registers 150°F in the center of the roulade.

Remove roulade from the oven and allow to rest, covered with aluminum foil, for 15 minutes before serving. Slice roulade and drench each slice in any juices that have escaped, then serve.

Note: Check out the many videos on tying roasts on the internet; this is one technique better seen than described!

Candy Cap Éclairs with Reishi Chocolate Glaze

GRAHAM STEINRUCK

Yield: 12 éclairs

I absolutely love éclairs, especially when they are filled with maple- or vanilla-flavored cream with a nice dark chocolate glaze on top. I thought it would be fun to infuse the classic French pastry with fungi by adding candy cap mushrooms (*Lactarius rubidus, L. rufulus*) to the pastry cream and reishi to the glaze. This recipe has a few steps, but don't be daunted! Éclairs are really easy to make and a completely different experience when they are made fresh. This is the kind of dessert I like to do at my mushroom-centric dinner events at the Telluride Mushroom Festival.

For the pastry cream:

- ½ ounce dried candy cap mushrooms, crushed
- 2 cups whole milk
- 1 large egg plus 3 large egg yolks
- 2½ tablespoons cornstarch
- 5 tablespoons granulated sugar
- 1/8 teaspoon salt
- 2 tablespoons unsalted butter, cut into 1/2-inch pieces
- ½ teaspoon bourbon vanilla extract (optional)

For the pâté a choux:

- 4 tablespoons unsalted butter
- ¼ cup milk
- ¼ cup water
- Salt
- ½ cup flour
- 2 large eggs
- For the glaze
- ¼ teaspoon red reishi extract powder
- 4 ounces semi-sweet chocolate, broken into pieces
- ½ cup heavy whipping cream

To make the pastry cream:

Combine the dried candy caps and milk in a small saucepan and bring to a simmer over medium-high heat, stirring occasionally. Remove from the heat and allow to steep, covered, for a minimum of 1 hour, or overnight in the refrigerator. In a medium bowl, combine the whole egg, egg yolks, cornstarch, sugar and salt. Whisk until just combined. Reheat the mushrooms and milk in a medium saucepan over medium heat. Make sure the milk doesn't boil or it will scorch. Strain the hot milk into a measuring cup. Pour about 1 tablespoon of hot milk into the egg mixture and whisk until combined. Continue to add the hot milk in small increments until two-thirds of the milk has been mixed in. Add the rest of the milk all at once and whisk until combined. Pour the mixture back into the saucepan and bring to a simmer over medium heat, whisking constantly until the mixture is the texture of a very thick pudding, 6 to 12 minutes. Lower the heat, continue to simmer while whisking a few more minutes until the mixture is thick and stiff. Again, stir constantly and be careful not to burn the mixture. Turn off heat and add the butter, one piece at a time, stirring all the while. Make sure each piece of butter is completely melted before adding the next. Whisk in the vanilla extract, if using. Pour the cream into a bowl and cover with plastic wrap, making sure the wrap contacts the surface of the cream so it does not form a skin. Cool in refrigerator for at least 1 hour, although it can hold in the refrigerator for up to a couple of days.

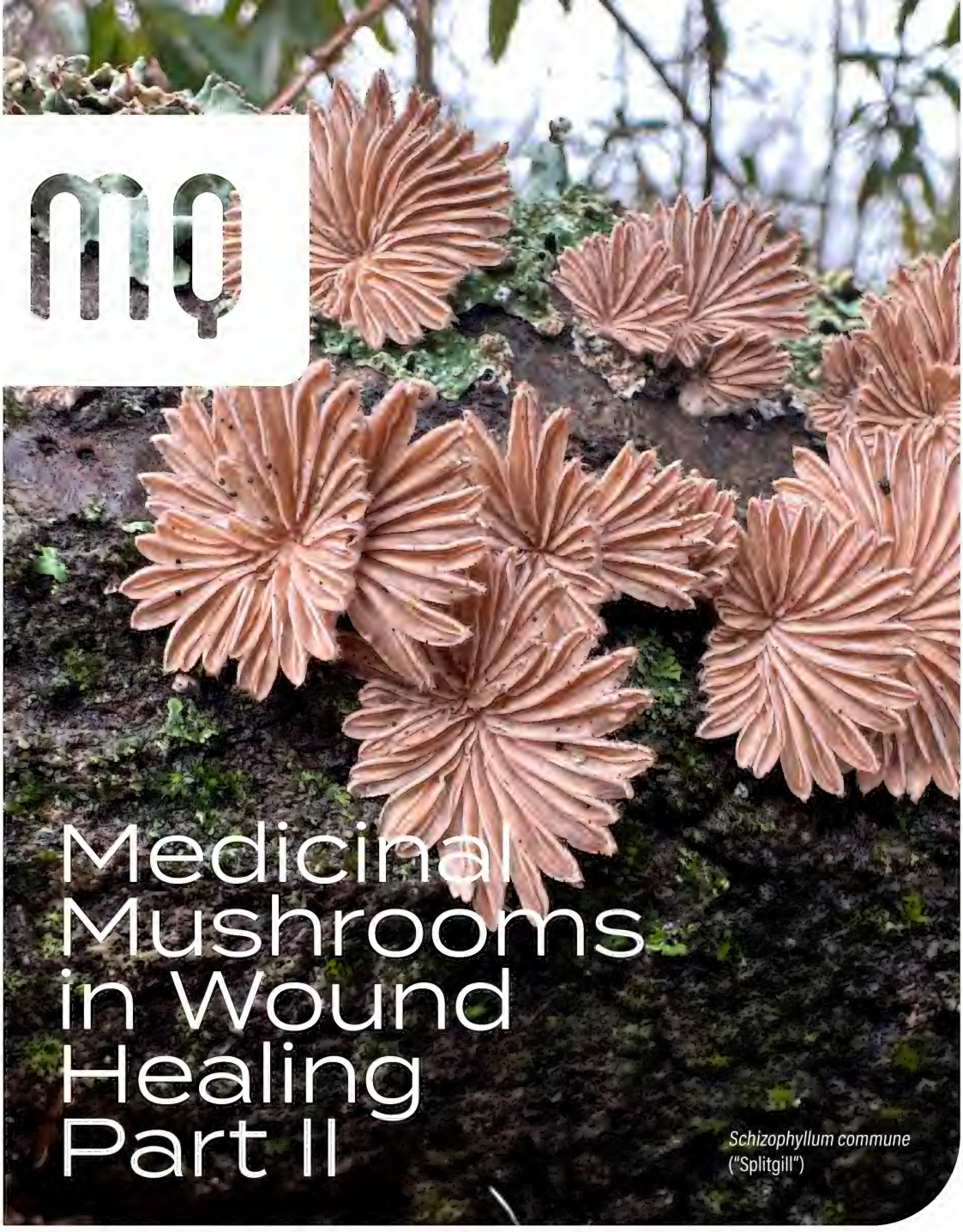
To make the pâté a choux:

Preheat the oven to 425F. Combine the butter, milk, water, and salt to taste in a small saucepan and bring to a simmer over medium heat. When the butter has melted, add flour all at once and stir vigorously with a wooden spoon. Once flour has been incorporated, continue to cook, stirring over medium heat, about 2 minutes, until the mixture forms a smooth ball and a thin film forms on the bottom of the pan. Transfer the mixture to a bowl and continue to beat with wooden spoon for 1 minute to cool slightly. Mix in the eggs one at a time, making sure the first egg is fully incorporated before adding the second. The mixture should form a smooth dough. When the dough is pulled up away from the bowl, a thick ribbon should form. Place the dough into a pastry bag fitted with a ½-inch round or star tip. Pipe 12 strips of dough 4 to 5 inches long about ¾ of an inch wide onto a baking sheet lined with a silicone mat or wax paper, making sure to leave 1½ inches between the pastries. Bake in the hot oven for 10 minutes until the dough is set. Reduce the oven temperature to 325F and bake for another 10 minutes, until the pastries are golden brown. Transfer to a wire rack and allow to cool completely before filling. When the pastries are cool, fill a separate piping bag or pastry injection device (like a large syringe) with the pastry cream. Poke a hole at both ends of the éclairs and fill them completely full with pastry cream.

To make the glaze:

Combine reishi extract powder and chocolate pieces in a bowl wide enough to dip in an éclair. Bring the cream to a simmer in a small saucepan over medium heat. Pour the hot cream over the reishi-chocolate mixture and shake the bowl to make sure the chocolate is completely submerged in the cream. After a few minutes, gently whisk until the chocolate and cream are mixed and glossy. Allow to cool slightly before dipping the filled éclairs. Make sure to shake off any excess glaze, then place pastries on a wire rack to allow glaze to set.

Note: The éclairs can be stored in an airtight container in the refrigerator for a few days or frozen for up to a month.



Medicinal Mushrooms in Wound Healing Part II

Schizophyllum commune ("Splitgill")

HAYDEN
TYLER
JOHNSON

Fungi have traditionally been utilized as wound-healing technologies by cultures all over the world. The many reports of early peoples utilizing fungi for wound healing have opened many avenues for scientific questioning.

Can these healing properties be replicated in a lab setting? Some mushrooms, including puffballs, were used at various maturity levels but mostly as mature gleba or spores; is maturity level associated with degree of wound-healing activity? Can we identify what molecules contribute to healing properties? The answer to many of these questions is, in general, yes.

Lycoperdon species ("Puffball")

Before getting into it, I want to go over a few concepts. One word used a lot in studies involving living organisms is polysaccharides, which are sugar molecules connected in a long chain. Polysaccharides are ubiquitous in nature, representing some of the most common and necessary compounds for life such as energy-storing carbohydrates and structural compounds like cellulose and lignin in plants or chitin in fungi and other organisms. When investigating substances for wound-healing properties, a place many researchers start is with cell cultures, running experiments like growing skin cells in a petri dish, disturbing them in some manner such as scratching them, and then measuring parameters related to the healing process such as cell migration or levels of gene expression.[1] Some cell studies use different types of cells, and some obtain other measures like microbial resistance. Certain experiments determine parameters, like antioxidant activity using chemical assays (antioxidants are thought to promote wound healing by helping control oxidative stress).[2] Another common route for probing for pro-healing potential is by inducing reproducible injuries in animal models such as mice or rats and measuring such parameters relevant to the healing process as levels of inflammatory signals, speed of wound closure and degrees of tissue remodeling (blood vessel formation, collagen deposition, ect.).[3] In the context of natural products like fungi, these studies often involve some sort of extraction process to isolate certain groups of molecules prior to application to the wound in order to single out which molecules are responsible for which properties.

The humble puffball has quite the history as a medicinal mushroom and researchers have taken notice. Two studies out of the University of Belgrade

report on puffball species, specifically investigating whether the maturation of the fruitbody had significant effects on levels of compounds by measuring those compounds using analytical techniques and determining biological activity through chemical assays. One study compared mycelium, young fruitbody, and mature fruitbody (the powdery, sporey mass that is the gleba of a mature puffball) of *Bovistella utriforme* and found increased antioxidant activity in extracts from gleba compared to younger fruitbodies and mycelium, as well as increased levels of certain bioactive molecules like phenols and free ergosterol, among others.[4] In a separate study, *Lycoperdon excipuliforme* and *Lycoperdon pratense* extracts from young and mature fruitbodies were screened for potential medicinal skin-care compounds, and the researchers found higher concentrations of compounds with known antioxidant properties in the mature gleba.[5] These researchers concluded that the process of the puffball transforming from firm fruitbody to sporey gleba leads to production of certain medicinal molecules and suggested the maturation process may even serve to preserve these compounds. In both studies, the immature puffballs were slightly more effective than their mature counterparts in terms of antimicrobial activity; however, mature puffballs still exhibited an antimicrobial effect. A 2022 study in China investigated puffball spores as a wound-healing agent in a diabetic-rat model (a pertinent model, as diabetes and related metabolic syndrome are global epidemics and adversely affect the wound-healing process, increasing the likelihood that a wound will be chronic). This study reported accelerated wound-closure time in spore-treated rats compared to untreated controls and noted improved tissue remodeling, improved vascular signals, reduced inflammation and increased antioxidant activity.[6] A further example of modern researchers leveraging age-old techniques comes from scientists in Mongolia who combined a protein called calvacin, derived from the giant puffball *Calvatia gigantea*, with a bioactive plant extract to produce an effective burn-healing agent that improved healing in rats (these researchers note the traditional use of this mushroom in wound management in Mongolian medicine).[7]

The vast assortment of fungi with wound-healing potential in ethnomycological reports is enough to make you wonder, do all fungi have what it takes to improve the wound-healing process? It might be a stretch to make such a claim; however, several familiar classes of compounds found in the cell walls of all fungi are quickly becoming some of the most popular tools used by researchers to tackle problems

related to wound healing. One such compound is chitin, that compound that you hear about when being told always to cook your mushrooms before eating them. Chitin makes up a significant portion of the cell walls in fungi and has biodegradable, hemostatic (i.e., it stops bleeding), antimicrobial properties and, importantly, its structure is a good mimic of the extracellular matrix in animals (in other words, it is generally highly biocompatible in humans and has many similar properties as our tissues).[8,9] Chitin is relatively easy to extract; however, it is hard to dissolve and thus difficult to fine-tune for biomedical applications.

Tremella fusiformis ("White Jelly Fungus")

This brings us to our second powerful fungal polysaccharide, chitosan. Chitosan is a derivative of chitin and is found naturally in many fungi, although generally not in as high quantities as chitin. Chitosan has the healing properties of chitin with a few major upgrades: (1) it is easy to dissolve and manipulate into all sorts of nanofibrous scaffolds, grafts, gels, powders or membranes; and (2) it is simple to modify chemically and attach molecules with additional bioactive properties.[8] Chitin and derivatives like chitosan are the only positively charged naturally occurring biopolymers which, when applied to a bleeding wound, provide benefits that include promoting coagulation by attracting and adsorbing red blood cells and platelets.[10,11] Chitosan is popular in the biomedical engineering space, with many current and evolving applications in tissue regeneration and wound healing, among other uses. In the Biomedical Engineering department at the University of Memphis, researchers are working on innovative applications for chitosan such as bone scaffolds for craniofacial surgery,[12] guided bone generation membranes,[13] or electrospun membranes for skin wound healing.[14] Beyond fancy tissue-engineering applications, chitosan is the major component in FDA-approved hemostatic bandages,[15] gauzes,[16] powders and more (you can even find some on Amazon). Most chitin used to derive chitosan for biomedical purposes comes

from crustaceans; however, chitin derived from mushrooms is a simpler process that is relatively underexplored in biomedical applications.[17]

Continuing the trend of potent pro-healing polysaccharides is a familiar face in the medicinal mushroom realm, the beta-glucan. Beta-glucans are abundant in fungal cell walls and possess a particular penchant for modulating the immune response. Beta-glucans applied topically are reported to have antioxidant, anti-inflammatory and antimicrobial effects. Like chitin and chitosan, beta-glucans are recognized as an excellent mimic of the mammalian extracellular matrix and can be manufactured as hydrogels, nanofibers and membranes for advanced wound-healing applications.[18] A 2019 study in Korea prepared wound dressings from beta-glucans isolated from splitgill (*Schizophylum commune)*, which accelerated healing in mice,[19] and a similar study from the same research group compared wound-healing effects of beta-glucans from splitgill, black yeast, barley, and a protist and found the splitgill polysaccharides to be the most effective at promoting healing in cell and mouse experiments.[20] A study out of Brazil reported that beta-glucans from the birch polypore (*Piptoporus betulinus)* promoted cell migration in a cell-scratch assay.[21]

The many wound dressings developed with healing polysaccharides accelerate healing in many cases where traditional wound dressings like pads or gauze might fail (due to need for periodic dressing changes and given the environment they foster is less conducive to healing),[19,22] and are being explored as hemostatic agents in many conditions such as traumatic injuries[16,23] (including internal bleeding and surgeries)[24] and other conditions where limiting bleeding is important and difficult to control.[25] It is essential to keep in mind that polymers like chitin, chitosan,[17] and beta-glucans are not individual compounds but rather vast groups of related compounds with varying sizes, branching, structures and attachments, with each variation affecting potential biological activity. Given the natural variation of these polymers and myriad of potential applications, there is plenty of research left to be done.

As spores and mushrooms are composed of the powerful polysaccharides discussed above, they have many of the same properties. Ancient peoples around the world used spores and powdered fungal fruit bodies as hemostatic, wound-healing agents. Using such fine particles provided several important benefits in

the high surface area for increased interaction at the wound surface[26,27] and ability to cover highly irregular, deep wound surfaces.[28] Similar to the ancient use of fungal powders, modern researchers recognize the power of powders with chitosan and other polysaccharides researched and utilized today in treating traumatic civilian and combat wounds.

Auricularia species ("Wood Ear")

Beyond the puffballs mentioned earlier, some fungi with ethnomycological reports for improving outcomes after injury[29] have been researched and reported to benefit healing processes, including King Alfred's cakes or *Daldinia concentrica* (crude extract improved wound healing in rats)[30] and tiger's-eye mushroom (*Lignosus rhinocerus)* (polysaccharide extract improved healing in gastric cell study).[31] Additionally, many mushrooms more commonly associated with medicinal potential have been researched and found to have wound-healing properties: lion's mane (*Hericium erinaceus;* crude extract accelerated wound closure in rats);[32] wood ear (*Auricularia auricula*; polysaccharide extract improved healing in excised pig ear cells);[33] polysaccharide extract improved healing in cell studies),[34] snow fungus (*Tremella fuciformis;* polysaccharide extract promoted healing in excised pig ear cells);[33] reishi (*Ganoderma lucidum;* polysaccharide extract enhanced wound healing in rats;[35] polysaccharide extract improved healing of gastric ulcers in rats;[36] spore oil improved burn healing in mice);[37] hemlock reishi (*Ganoderma tsugae;* extracted chitin improved wound healing in cell studies),[38] and *Ganoderma ambionense* (polysaccharide extract improved wound healing in cell studies).[39] Several choice edible mycorrhizal species have been screened for wound-healing potential, including *Cantharellus*,[40] and matsutake (*Tricholoma matsutake)*,[41] with separate studies finding extracts of each to accelerate healing in rodents. Two studies by a research group in Japan even report improved wound healing upon consumption of cauliflower mushroom (*Sparassis crispa)*. In one study, oral administration improved healing in diabetic mice[42] and in another

both oral and topical beta-glucan administration independently sped up healing in diabetic mice.[43]

Fungi provided our most ancient ancestors with food, medicine and opportunity; today they inspire cutting-edge research that promises to improve health for future generations. Building on top of the strong foundation laid by earlier peoples, researchers have been able to verify many healing properties of medicinal mushrooms, with some mushroom derivatives being crafted into advanced biomedical biomaterials. The combined body of ethnomycological reports and peer-reviewed research make a strong case for further exploration of fungi as agents for wound healing.

References

1. Cory, G. (2011). Scratch-Wound Assay. Cell Migration, 25–30. doi:10.1007/978-1-61779-207-6_2
2. Fitzmaurice, S. D., Sivamani, R. K., & Isseroff, R. R. (2011). Antioxidant Therapies for Wound Healing: A Clinical Guide to Currently Commercially Available Products. Skin Pharmacology and Physiology, 24(3), 113–126. doi:10.1159/000322643
3. Masson-Meyers, D. S., Andrade, T. A. M., Caetano, G. F., Guimaraes, F. R., Leite, M. N., Leite, S. N., & Frade, M. A. C. (2020). Experimental models and methods for cutaneous wound healing assessment. International Journal of Experimental Pathology. doi:10.1111/iep.12346
4. Petrović, P., Vunduk, J., Klaus, A., Carević, M., Petković, M., Vuković, N., ... Bugarski, B. (2019). From mycelium to spores: A whole circle of biological potency of mosaic puffball. South African Journal of Botany, 123, 152–160. doi:10.1016/j.sajb.2019.03.016
5. Petrović, P., Ivanović, K., Jovanović, A., Simović, M., Milutinović, V., Kozarski, M., ... Bugarski, B. (2019). The impact of puffball autolysis on selected chemical and biological properties: puffball extracts as potential ingredients of skin-care products. Archives of Biological Sciences. 1(4):721-73. doi: 10.2298/abs190725055p
6. He T, Sun P, Liu B, Wan S, Fang P, Chen J, Huang G, Min W. Puffball spores improve wound healing in a diabetic rat model. Front Endocrinol (Lausanne). 2022 Aug 31;13:942549. doi: 10.3389/fendo.2022.942549. PMID: 36120443; PMCID: PMC9471372.
7. Buyantogtokh D, Chuluunbaatar E, Tsogzol M, Uranbileg Nyamdolgor, Chimedtseren C, Dagvatseren B. Wound Healing Effects of Calvacin Gel on Burn Wound in Rats. Biomed Pharmacol J 2020;13(2). doi: 10.13005/bpj/1935
8. Singh, R., Shitiz, K., & Singh, A. (2017). Chitin and chitosan: biopolymers for wound management. International Wound Journal, 14(6), 1276–1289. doi:10.1111/iwj.12797
9. Jiménez-Gómez, C. P., & Cecilia, J. A. (2020). Chitosan: A Natural Biopolymer with a Wide and Varied Range of Applications. Molecules, 25(17), 3981. doi:10.3390/molecules25173981
10. Roy, J. C., Salaün, F., Giraud, S., Ferri, A., Chen, G., & Guan, J. (2017). Solubility of Chitin: Solvents, Solution Behaviors and Their Related Mechanisms. Solubility of Polysaccharides. doi:10.5772/intechopen.71385
11. Hu, Z., Lu, S., Cheng, Y., Kong, S., Li, S., Li, C., & Yang, L. (2018). Investigation of the Effects of Molecular Parameters on the Hemostatic Properties of Chitosan. Molecules, 23(12), 3147. doi:10.3390/molecules23123147
12. Kozusko, S. D., Riccio, C., Goulart, M., Bumgardner, J., Jing, X. L., & Konofaos, P. (2018). Chitosan as a Bone Scaffold Biomaterial. Journal of Craniofacial Surgery, 1. doi:10.1097/scs.0000000000004909
13. Murali, V. P., Guerra, F. D., Ghadri, N., Christian, J. M., Stein, S. H., Jennings, J. A., ... Bumgardner, J. D. (2021). Simvastatin loaded chitosan guided bone regeneration membranes stimulate bone healing. Journal of Periodontal Research. doi:10.1111/jre.12883
14. Bryan A, Wales E, Vedante S, Blanquer A, Neupane D, Mishra S, Bačáková L, Fujiwara T, Jennings JA, Bumgardner JD. Evaluation of Magnesium-Phosphate Particle Incorporation into Co-Electrospun Chitosan-Elastin Membranes for Skin Wound Healing. Marine Drugs. 2022; 20(10):615. https://doi.org/10.3390/md20100615
15. Zhong Y, Hu H, Min N, Wei Y, Li X, Li X. Application and outlook of topical hemostatic materials: a narrative review. Ann Transl Med. 2021 Apr;9(7):577. doi: 10.21037/atm-20-7160. PMID: 33987275; PMCID: PMC8105794.
16. Butler, F. K. (2015). Tactical Combat Casualty Care. Encyclopedia of Trauma Care, 1548–1551. doi:10.1007/978-3-642-29613-0_403
17. Jones, M., Kujundzic, M., John, S., & Bismarck, A. (2020). Crab vs. Mushroom: A Review of Crustacean and Fungal Chitin in Wound Treatment. Marine Drugs, 18(1), 64. doi:10.3390/md18010064
18. Majtan, J., & Jesenak, M. (2018). β-Glucans: Multi-Functional Modulator of Wound Healing. Molecules, 23(4), 806. doi:10.3390/molecules23040806
19. Muthuramalingam, K., Choi, S. I., Hyun, C., Kim, Y. M., & Cho, M. (2019). β-Glucan-Based Wet Dressing for Cutaneous Wound Healing. Advances in Wound Care. doi:10.1089/wound.2018.0843

20. Seo, G., Hyun, C., Choi, S., Kim, Y. M., & Cho, M. (2019). The wound healing effect of four types of beta-glucan. Applied Biological Chemistry, 62(1). https://doi.org/10.1186/s13765-019-0428-2
21. De Jesus, L. I., Smiderle, F. R., Ruthes, A. C., Vilaplana, F., Dal'Lin, F. T., Maria-Ferreira, D., ... Iacomini, M. (2018). Chemical characterization and wound healing property of a β-D-glucan from edible mushroom Piptoporus betulinus. International Journal of Biological Macromolecules, 117, 1361–1366. doi:10.1016/j.ijbiomac.2017.12.107
22. Elangwe CN, Morozkina SN, Olekhnovich RO, Krasichkov A, Polyakova VO, Uspenskaya MV. A Review on Chitosan and Cellulose Hydrogels for Wound Dressings. Polymers. 2022; 14(23):5163. https://doi.org/10.3390/polym14235163
23. Welch, M., Barratt, J., Peters, A., & Wright, C. (2019). Systematic review of prehospital haemostatic dressings. Journal of the Royal Army Medical Corps, jramc–2018–001066. doi:10.1136/jramc-2018-001066
24. Xia, Y., Yang, R., Wang, H., Yuehong, L., & Fu, C. (2022). Application of chitosan-based materials in surgical or postoperative hemostasis. Frontiers in Materials. doi: 10.3389/fmats.2022.994265
25. Tickle, J. Evaluation of a chitosan dressing in the management of hard-to-heal wounds. (2023). British Journal of Nursing.
26. Ko Y-G, Kim BN, Kim EJ, Chung HY, Park SY, Kim Y-J, Kwon OH. Bioabsorbable Carboxymethyl Starch–Calcium Ionic Assembly Powder as a Hemostatic Agent. Polymers. 2022; 14(18):3909. https://doi.org/10.3390/polym14183909
27. Eden, C., Buonomo, O.C., Busch, J. et al. An international multidisciplinary peer-driven consensus on the optimal use of hemostatic powders in surgical practice. Updates Surg 73, 1267–1273 (2021). https://doi.org/10.1007/s13304-021-01136-x
28. Emami, S. & Ebrahimi, M. Bioactive wound powders as wound healing dressings and drug delivery systems. (2023). Powder Technology. doi:10.1016/j.powtec.2023.118501
29. Yap HY, Ariffeen Rosli MF, Tan SH, Kong BH, Fung SY. The Wound Healing Potential of Lignosus rhinocerus and Other Ethno-myco Wound Healing Agents. Mycobiology. 2023 Jan 23;51(1):1-15. doi: 10.1080/12298093.2022.2164641. PMID: 36846625; PMCID: PMC9946334.
30. Thangaraj, R., Raj, S., & Renganathan, K. (2017). WOUND HEALING EFFECT OF KING ALFERD'S MUSHROOM (DALDINIA CONCENTRICA) USED BY TRIBES OF SIRUMALAI HILLS, TAMILNADU, INDIA. International Journal of Pharmacy and Pharmaceutical Sciences, 9(7), 161. doi:10.22159/ijpps.2017v9i7.20628
31. Veeraperumal, S., Qiu, H.-M., Tan, C.-S., Ng, S.-T., Zhang, W., Tang, S., ... Liu, Y. (2021). Restitution of epithelial cells during intestinal mucosal wound healing: The effect of a polysaccharide from the sclerotium of Lignosus rhinocerotis (Cooke) Ryvarden. Journal of Ethnopharmacology, 274, 114024. doi:10.1016/j.jep.2021.114024
32. Abdulla MA, Fard AA, Sabaratnam V, Wong KH, Kuppusamy UR, Abdullah N, Ismail S. Potential activity of aqueous extract of culinary-medicinal Lion's Mane mushroom, Hericium erinaceus (Bull.: Fr.) Pers. (Aphyllophoromycetideae) in accelerating wound healing in rats. Int J Med Mushrooms. 2011;13(1):33-9. doi: 10.1615/intjmedmushr.v13.i1.50. PMID: 22135902.
33. Khamlue, R., Naksupan, N., Ounaroon, A., & Saelim, N. Skin Wound Healing Promoting Effect of Polysaccharides Extracts from Tremella fuciformis and Auricularia auricula on the ex-vivo Porcine Skin Wound Healing Model. (2012). International Proceedings of Chemical, Biological and Environmental Engineering, 43, 93-98. https://doi.org/10.7763/ ipcbee
34. Mapoung, S., Umsumarng, S., Semmarath, W., Arjsri, P., Thippraphan, P., Yodkeeree, S., & Limtrakul (Dejkriengkraikul), P. (2021). Skin Wound-Healing Potential of Polysaccharides from Medicinal Mushroom Auricularia auricula-judae (Bull.). Journal of Fungi, 7(4), 247. doi:10.3390/jof7040247
35. Cheng, P.-G., Phan, C.-W., Sabaratnam, V., Abdullah, N., Abdulla, M. A., & Kuppusamy, U. R. (2013). Polysaccharides-Rich Extract ofGanoderma lucidum(M.A. Curtis:Fr.) P. Karst Accelerates Wound Healing in Streptozotocin-Induced Diabetic Rats. Evidence-Based Complementary and Alternative Medicine, 2013, 1–9. doi:10.1155/2013/671252
36. Gao, Y., Tang, W., Gao, H., Chan, E., Lan, J., & Zhou, S. (2004). Ganoderma lucidum Polysaccharide Fractions Accelerate Healing of Acetic Acid-Induced Ulcers in Rats. Journal of Medicinal Food, 7(4), 417–421. doi:10.1089/jmf.2004.7.417
37. Jiao C, Xie Y, Yun H, Liang H, He C, Jiang A, Wu Q, Yang BB, . The effect of Ganoderma lucidum spore oil in early skin wound healing: interactions of skin microbiota and inflammation. Aging (Albany NY). 2020 Jul 21; 12:14125-14140 . https://doi.org/10.18632/aging.103412
38. Hung, W.-S., Fang, C.-L., Su, C.-H., Lai, W.-F. T., Chang, Y.-C., & Tsai, Y.-H. (2001). Cytotoxicity and immunogenicity of SACCHACHITIN and its mechanism of action on skin wound healing. Journal of Biomedical Materials Research, 56(1), 93–100. doi:10.1002/1097-4636(200107) 56:1<93::aid-jbm1072>3.0.co;2-b
39. Zhao, S., Lei, M., Xu, H., He, H., Suvorov, A., Wang, J., ... Chen, L. (2021). The normal cell proliferation and wound healing effect of polysaccharides from Ganoderma amboinense. Food Science and Human Wellness, 10(4), 508–513. doi:10.1016/j.fshw.2021.04.013
40. Nasiry D, Khalatbary AR, Ebrahimzadeh MA. Anti-Inflammatory and Wound-Healing Potential of Golden Chanterelle Mushroom, Cantharellus cibarius (Agaricomycetes). Int J Med Mushrooms. 2017;19(10):893-903. doi: 10.1615/IntJMedMushrooms.2017024674. PMID: 29256843.
41. Zhu W, Chen Y, Qu K, Lai C, Lu Z, Yang F, Ju T, Wang Z. Effects of Tricholoma matsutake (Agaricomycetes) Extracts on Promoting Proliferation of HaCaT Cells and Accelerating Mice Wound Healing. Int J Med Mushrooms. 2021;23(9):45-53. doi: 10.1615/ IntJMedMushrooms.2021039854. PMID: 34591397.
42. Kwon, A.-H., Qiu, Z., Hashimoto, M., Yamamoto, K., & Kimura, T. (2009). Effects of medicinal mushroom (Sparassis crispa) on wound healing in streptozotocin-induced diabetic rats. The American Journal of Surgery, 197(4), 503–509. doi:10.1016/j.amjsurg.2007.11.021
43. Yamamoto, K., & Kimura, T. (2013). Orally and Topically Administered Sparassis crispa (Hanabiratake) Improved Healing of Skin Wounds in Mice with Streptozotocin-Induced Diabetes. Bioscience, Biotechnology, and Biochemistry, 77(6), 1303–1305. doi:10.1271/ bbb.121016

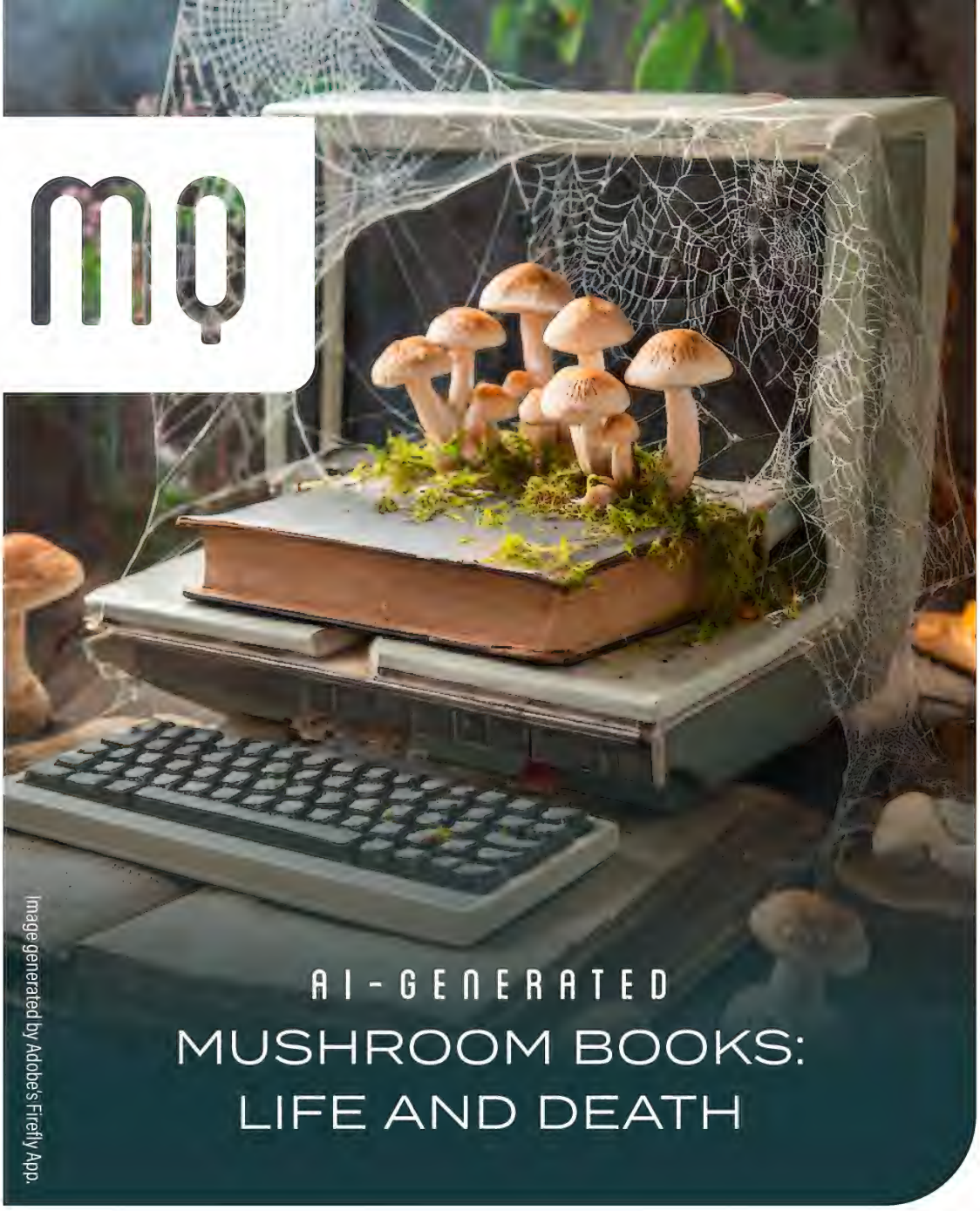


Image generated by Adobe's Firefly App.

AI-GENERATED MUSHROOM BOOKS: LIFE AND DEATH

ELAN TRYBUCH, SECRETARY OF NEW YORK MYCOLOGICAL SOCIETY

After reading an original tweet and comment thread on Reddit, I ran my own search on Amazon.com and found several books that appeared to be written by AI.

Reprinted with permission from NYMS website

It was pretty easy to find a slew of books that appeared to be generated by Artificial Intelligence (AI). A few common traits that will indicate an AI-written book are that they are written by unknown authors and the use of Latin names that just don't exist in today's taxonomy are some dead giveaways.

The reason I originally posted about generative AI in mycology is to raise awareness within our broader community. AI does not know the subtle differences between a mushroom that is poisonous such as the Death Cap (*Amanita bisporigera*) versus one that is not, such as Wood Mushroom (*Agaricus silvicola*). True story: NYMS members have stopped people who were found foraging in Harriman State Park, New York who, before AI books, were foraging for *Amanita bisporigera*. Luckily our members saw them and were able not only to explain to them the differences but teach them about this deadly mushroom. With regard to *Amanita bisporigera*, one way we do so on our walks is with the use of KOH (potassium hydroxide) to see the color change on the cap.

As a result of our members' encounters with numerous foraging groups, a Twitter post and campaign was spawned.

Image generated by Adobe's Firefly App.

Examples Found on Amazon.com

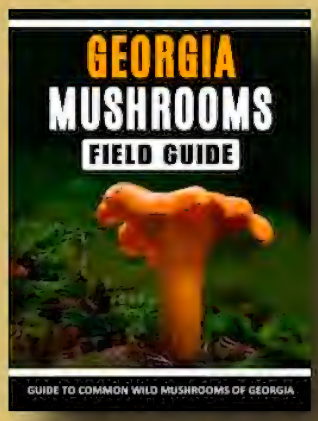


Image generated by Adobe's Firefly App.

Why is this happening, you might ask? The answer is simple: money. I am merely exposing and discussing one vector in which bad actors are leveraging the ease with which one can create a book, complete with art, and sell it for money. All they have to do is generate a two- to three-sentence prompt. Mushrooms are an easy target and we are in a shroom boom. Many people during the pandemic took to the outdoors; part of that inquisitiveness that we have all felt is foraging and being able to identify edible fungi. With a rise in popularity, lack of resources and cheap price point, there are many folks who are willing to buy, on a whim, a $9.99 field guide versus paying the steep prices for academic-quality books. Because of the niche market, publishers do not print lots of books; simple supply and demand can also factor into the steep prices of high-quality books.

Our original tweet, back in August, garnered a lot of attention. We had numerous media outlets reach out to the club for comment. You may read some of the articles published, as follows:

- 404 News by Samantha Cole
- Howtobe247.com by Suswati Basu
- *The Guardian* by Dan Milmo

After all the above articles were written, Sigrid Jakob, current President of New York Mycological Society, sent me an Instagram story post by well-known west-coast mycologist Damon Tighe. His story speaks to the increasing urgency, in which members of mycology clubs need to be judicious in calling out books that are AI-generated. Please make sure, before you ever eat a mushroom that you find, that you yourself can positively identify it with 100% accuracy. Before then, join a local mycology club and learn from those who can.

We look forward to seeing you in the woods!

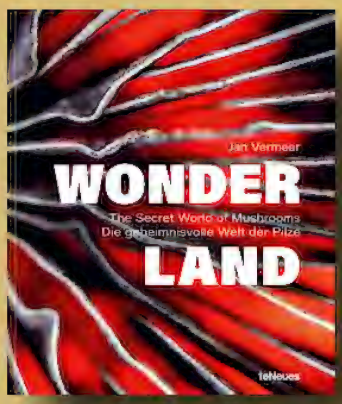
NAMA

Reads

Explore Captivating Literature Dedicated to Mushrooms and Mycology.

Wonderland: The Secret World of Mushrooms

BOOK REVIEW BY LIZ WEINSTEIN



Author: Jan Vermeer
Publisher: teNeues
July 17, 2023
ISBN 978-3-96171-510-7
192 pages (170 color photographs)
$55 USD
https://bit.ly/wonderlandofmushroooms

Jan Vermeer is an award-winning nature photographer, having been featured in publications such as *National Geographic* and *BBC Wildlife* magazine. His new book, *Wonderland: The Secret World of Mushrooms*, features 170 stunning images of the world of mycology.

Wonderland is a collection of mostly abstract and macrophotography images taken in the author's home county of the Netherlands. In a land containing roughly 6,000 species of fungi, a good portion of the images were shot on Vermeer's home property, with an outdoor area spanning just under an acre. The images celebrate

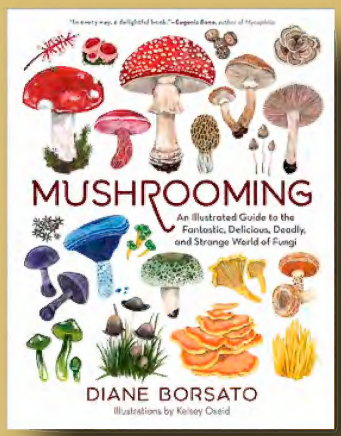
fungi's neverending variety of shapes, textures, colors and patterns in larger-than-life landscapes of even the tiniest fungal features. The macro images of guttation, spore surfaces and slime-mold structures are particularly fascinating. Vermeer creatively accentuates and manipulates light, perspective and color, illuminating several species' most defining characteristics. Many of the images gracefully translate into saturated sculptures, giving the viewer a chance to see these nuanced features in a way not possible with the naked eye. Refreshingly, Vermeer also includes many species not typically depicted in the limelight of fungi photography.

The monograph is divided into sections, focusing on topics such as fungal varieties, medicinal usage and properties, and toxic mushrooms. Each section is accompanied by fairly short text sequences in both English and German, and every photo is noted with its scientific and colloquial name. The writing covers many topics often found in books about mycology but delivers the information in a fresh, light manner, peppered with fascinatingly pertinent facts that will keep even non-mycology-minded readers interested. Vermeer also includes a chapter on slime molds and explains that scientists are still not sure how to categorize the stuff (neither fungus nor animal nor plant); we mushroom lovers are fascinated by the organisms all the same and are happy to see them included in this publication. Vermeer's images offer views into the greater ecosystem of particular species, with many shots displaying clues to the types of woodlands within which these specific mushrooms can be found growing. On a much smaller scale, we often see familiar forest friends like a spider, springtail or tick symbiotically trudging beneath the cap of the mycelial subjects. I appreciate the addition near the book's end of mushroom photography tips, including a brief equipment list and specific technical camera settings. I find it informative and very approachable for newbie nature photographers.

Wonderland is a beautiful coffee table book that is not only perfect for any mycology or slime-mold enthusiast but also those interested in nature and macrophotography, nature lovers, visual artists, naturalists and outdoor enthusiasts in general. I appreciate its versatility as a collection of artwork and a scientific resource to study, close up, mycological features of a wide variety of fungi and slime molds. It's also a great inspiration to those of us who are nature photographers and appreciate, quite literally, the tiny things in life. Vermeer states about his photography that he wants "to evoke awe and reverence" and I'd say with this book of work, he does just that.

Mushrooming: An Illustrated Guide to the Fantastic, Delicious, Deadly, and Strange World of Fungi

BOOK REVIEW BY BARBARA CHING, PHD


MUSHROOMING
An Illustrated Guide to the Fantastic, Delicious, Deadly, and Strange World of Fungi
DIANE BORSATO
Illustrations by Kelsey Oseid

Author: Diane Borsato
Illustrator: Kelsey Oseid
U.S. publisher: Experiment Publishing, 2023
Canadian publisher: Douglas and McIntyre, 2022
232 pages
$25 USD
https://bit.ly/mushroomingbook

Mushrooming would make a good read for the myco-neutral (the significant others of the myco-obsessed). As a gift, it offers an introduction to the less obvious charms of forays. It's a lively new invitation to companionship, a good way to build a bridge for your hesitant friends and family members. They likely already know about the overflowing baskets and the empty ones and aren't much excited or agitated by either. They may find identification books, such as David Arora's, overwhelming in their scientific detail.

As the adjective avalanche in the subtitle suggests, this book is different in a good way. It reports on the emotions and sensory experiences mushrooming provokes. It's full of charming, almost animated gouache color illustrations (127, to be precise) by Kelsey Oseid, mostly of mushrooms, although mushroom identification has a limited role in this book. Illustration, in every sense of the word, is the point; taxonomy and description less so. Green-Capped Jelly Baby (*Leotia viscosa*), for example, is hailed as a "notable little fungus to pat on the head and coo to in a high-pitched voice" (97).

Borsato is an artist and art educator and a great companion! Her book creatively devotes some pages to the cool stuff we see in the trees or on the forest floor, stuff that could be carried home if that's important to you. Like what, you may ask? Wouldn't your energetic schoolkid nieces and nephews love finding a raccoon skull? Finding the vividly painted page on *Hydnellum peckii* and then planning a hunting adventure for it would be fun, too. In a word, the book portrays the contexts of mushrooming and suggests ways to expand it. In this respect, the book would be useful and interesting for mushroom club presidents and foray committee members.

Borsato describes a Chinatown foray she organized with the NAMA-affiliated Mycological Society of Toronto (TMS). Toronto has an extensive and vibrant Chinatown and one day, upon slipping into a market to shelter from a sudden rainfall, Borsato became captivated by the variety of fresh and dried mushrooms for sale, so she organized a Chinatown foray. As she put it, "I realized how limited my knowledge was. I knew hundreds of mushrooms but didn't recognize fungi commonly found in a local market, blocks from my home" (49). She recruited some Mandarin and Cantonese speakers from TMS to lead a foray into a convenient suburban Chinese market. The NAMA-affiliated New York Mycological Society (NYMS) followed suit, and Borsato later expanded the urban foraying to "Japanese, Korean, Italian, and Eastern European markets across Manhattan and Brooklyn" (52).

Recognizing that mushrooms are both natural phenomena and "cultural artifacts," she follows in the footsteps of artist and birdwatcher Mark Dion, who went "birding" in New York City's Metropolitan Museum of Art and registered many unexpected finds such as a magpie in Velazquez painting. Unfortunately, after seven and a half hours of intent seeking, she found "no intentional depictions of recognizable fungi" (136). Borsato wants to return with members of NYMS, hoping that a group of expert eyes will find more fungi than she did on her own.

Books are easy to gift wrap, but depending on the recipient, I might not wrap this one and, rather than tucking it under a tree, I'd set it on a table (along with some favorite snacks) in the coziest reading nook of the house in hopes that the intended reader would pick it up and settle in with it during a post-holiday lull. Alternatively, online booksellers will wrap and ship the book to more distant recipients.

I do feel obliged to add that this book may not please the woke-averse. It addresses feminist and post-colonial issues openly and actively. I myself would love to go on a foray with Borsato (hint hint).

MYCO Opportunities

Coming in April to Argentina: 11th International Workshop on Edible Mycorrhizal Mushrooms

DAVID PILZ

Ever had a hankering to seek edible mushrooms down south? How about Argentina? April 22 to 26, 2024 is your opportunity to attend the 11th International Workshop on Edible Mycorrhizal Mushrooms, (IWEMM11).

The IWEMM11 logo depicts *Ramaria patagonica*, a Patagonian Andean forest endemic used by native peoples since ancient times.

These workshops have taken place every several years as a part of the more general International Conferences on Mycorrhizae (ICOM) begun in 1996 in Berkeley, CA. Both events were again held concurrently in Uppsala, Sweden in 1998 but in 2001 the IWEMM3 was held separately in Christchurch, New Zealand just before the ICOM3 in Adelaide, Australia. Thereafter, the next ten IWEMMs have been organized independently at venues around the world, reflecting their International appeal.

The workshops bring together specialists in diversity, economics, ecology, biotechnology, mycosilviculture and cultivation of truffles as well as other edible ectomycorrhizal fungi. The event features international scientists presenting new research focused on the economic and cultural importance of these fungi.

IWEMM celebrants, photo courtesy of David Pilz.

A hundred or more abstracts by other scientists and students are displayed to provide insights about ongoing research projects. In the middle of the week, all the participants are provided a day of cultural events or field trips. After the conference a separate, week-long field trip is available for those who wish for a more thorough introduction to local fungi and landscapes. The diversity of these workshops makes them interesting to amateurs, entrepreneurs and policymakers, as well as students and scientists.

One of the event organizers is Dra. Carolina Barroetaveña, who was a visiting student with the Mycology Team at Oregon State University in Corvallis in the mid-1990s. She has since attended and participated in many of the subsequent IWEMMs and is currently working hard to provide a memorable event. The theme for this year's IWEMM11 is "Rescuing biodiversity and multiculturalism for local development."

Here is the website for the IWEMM11. Please check it regularly for updates and do not hesitate to contact the organizers about any questions you may have.

For those seeking even more in-depth flavor of these IWEMMS events, I have had the wonderful opportunity to attend one in Guatemala and another in Mexico, about which I wrote for *FUNGI Magazine*. Editor Britt A. Bunyard has generously made them freely available for download.

Happy Myco-Travels!